Gynochthodes oresbia Halford & A.J.Ford (Rubiaceae), a new and cryptic species from north-east Queensland

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Summary

Ford, A.J. & Halford, D.A. (2006). *Gynochthodes oresbia* Halford & A.J.Ford (Rubiaceae), a new and cryptic species from north-east Queensland. *Austrobaileya* 7(2): 357–364. *Gynochthodes oresbia* Halford & A.J.Ford is described, illustrated and distinguished from other Australian species. Notes on habitat, distribution, and conservation status are provided. An identification key to the species of *Gynochthodes* in Australia is presented.

Key Words: Rubiaceae, *Gynochthodes oresbia*, new species, taxonomy, Australian flora, Queensland flora, identification key

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Introduction

Gynochthodes Blume is a genus of approximately 18 species (IPNI 2006) distributed from south-east Asia to the Pacific (Mabberley 1997). Blume (1826) in the original publication of the generic name used the spelling '*Gynochtodes*'. However, Blume (1828) in a footnote deliberately changed the spelling of several generic names from his earlier 1826 work. One of the changes he made was '*Gynochtodes*' to '*Gynochthodes*'. According to Skog (1985) and Brummitt & Taylor (1990) Blume noted "in the discussion accompanying the list of 'corrected' names that some of the earlier (1826) spellings were wrong". Halford (2004) was unaware of Blume's later correction of the spelling of the generic name *Gynochtodes* and had agreed with Smith (1988) that "there appears to be no justification for such a change". Other recent authors (e.g. Johansson 1988; Robbrecht 1988; Igersheim & Robbrecht 1993) have maintained the original spelling as does the electronic version of *Index Nominum Genericorum* (ING 2006). However, we believe that Blume's change in spelling of '*Gynochtodes*' to '*Gynochthodes*' should be considered a formal and legal correction of the spelling of the generic name, acceptable under *Art.60.1* of the *International Code of Botanical Nomenclature* (Greuter *et al.* 2000).

Currently two endemic species of *Gynochthodes* (*G. australiensis* J.T.Johanss. and *G. sessilis* Halford) are recorded for Australia (Johansson 1988; Halford 2004). The genus is included in tribe *Morindeae* Miq. (Johansson 1987; Robbrecht 1988; Igersheim & Robbrecht 1993; Bremer & Manen 2000) and is closely related to *Morinda* L., *Caelospermum* Blume and *Pogonolobus* F.Muell. (Bremer & Manen 2000), all of which are found in, but not endemic to, Australia. *Gynochthodes* can be distinguished from *Morinda*, *Caelospermum* and *Pogonolobus* in Australia by the following combination of characters: axillary inflorescences, usually non-united flowers, corolla lobes with dense indumentum on the adaxial surface, lack of domatia in lateral vein axils of leaves and leaves drying black. The generic limits of the above *Morindeae* are currently being assessed and revised (S.Razafimandimbison 2005, pers. comm.).

Discussions between the two current authors about various taxa within the family Rubiaceae in Queensland led to the examination of material that was represented in the Queensland Herbarium (BRI) and Australian National Herbarium (QRS) under the ubiquitous and poorly documented genus

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Morinda. At the time the species described here as *Gynochthodes oresbia* was known from remarkably few fertile specimens, yet was well collected geographically. Its superficial vegetative resemblance to other species of *Morinda* has led in the past to it being referred to as an undescribed species in that genus (Forster & Halford 2002; Hyland *et al.* 2003). Critical examination of these few fertile specimens revealed that it was a new and undescribed species of *Gynochthodes*.

Materials and methods

The study is based upon the examination of herbarium material from BRI and QRS combined with field observations by the first author. All specimens cited have been seen by one or both authors.

Measurements of the floral parts and fruits of *G. oresbia* are based on material preserved in 70% ethanol. Common abbreviations in the specimen citations are: E.P. (Experimental Plot), L.A. (Logging Area), N.P.R. (National Park Reserve), S.F.R. (State Forest Reserve) and T.R. (Timber Reserve).

The abbreviation RE in the distribution and habitat notes refers to Regional Ecosystem, descriptions of which can be viewed at www.epa.qld.gov.au/projects/redd/landzone.cgi?bioregion=7.

Extent of occurrence estimates were derived from the validation of original collection localities. These data points were loaded into ESRI ArcView 3.2 and the draw polygon feature was used to calculate the area between the points. The area of occupation estimates were principally derived from a digital Regional Ecosystem map supplemented by the first author's knowledge of vegetation types and habitats within the Wet Tropics bioregion (hereafter referred to as the Wet Tropics) (Environment Australia 2005).

Taxonomy

Gynochthodes oresbia Halford & A.J.Ford, **species nov.** arcte affinis *G. australiensi* et *G. sessili*. A *G. australiensi* apice foliorum longe acuminato (acumine 5–8 mm longo) comparate illo *G. australiensis* quae obtusus usque breve acuminatus acumine ≤ 3 mm longo, et filamentis staminalis 2.7–3.1 mm longis in vicem 1.2–2.5 mm longis et inflorescentiis laxis differt. A *G. sessili* floribus fructibusque pedicellatis non sessilis et inflorescentiis laxis axe primario inflorescentiae 10–40 mm longo (in vicem illo *G. sessilis* 1 mm longo) et calycibus glabris non pilis adornis differt. Quoad inflorescentiam laxam *G. oresbia* etiam *G. epiphyticam* simulat sed domatia carens et in foliis maturis venis primariis lateralibus sub angulo 65–75° (vice 40–50°) a costa divergentibus differt. **Typus:** Queensland. Cook District: State Forest Reserve 194, Western [Herberton Range State Forest, south-west of Atherton], 30 December 2002, *B. Gray 8390* (holo: BRI [2 sheets + spirit]; iso: QRS [10 sheets to be distributed + spirit]).

Morinda sp. (Mt Finnigan L.J.Webb+ 12114) (Forster & Halford 2002).

Morinda sp. (Black Leaves BG 1677) (Hyland *et al.* 2003).

Gynochtodes sp. (Lamb Range) (Cooper & Cooper 2004: 442).

***Illustration*:** Cooper & Cooper (2004: 442), as *Gynochtodes* sp. (Lamb Range).

Shrub (when juvenile and before stems twine) or woody canopy vine with stems to 10 cm diameter at base, not fluted, lenticellate. Bark fissured to tessellated or nondescript. Branchlets green when fresh, turning black on drying; young branchlets terete when fresh, longitudinally striated when dried, smooth, glabrous; older branchlets woody becoming irregularly lenticellate with age. Axillary buds enclosed by cataphylls, occasionally cataphylls conspicuous at basal nodes of axillary shoots. Stipules interpetiolar, shortly sheathing, with short triangular lobes, 1.2–2.1 mm long, shortly acuminate, glabrous except for minute hairs (< 0.2 mm long) on margin, fragmenting or splitting as node thickens, moderately persistent. Leaves decussate, petiolate, discolorous, usually drying black, glabrous; petiole 5–13 mm long, channelled adaxially; lamina elliptic to narrow elliptic-obovate, 6.1–9.6 cm long, 2.1–4.3 cm wide, coriaceous, dark green to metallic dark green adaxially when fresh; base attenuate to narrowly cuneate-obtuse; apex usually

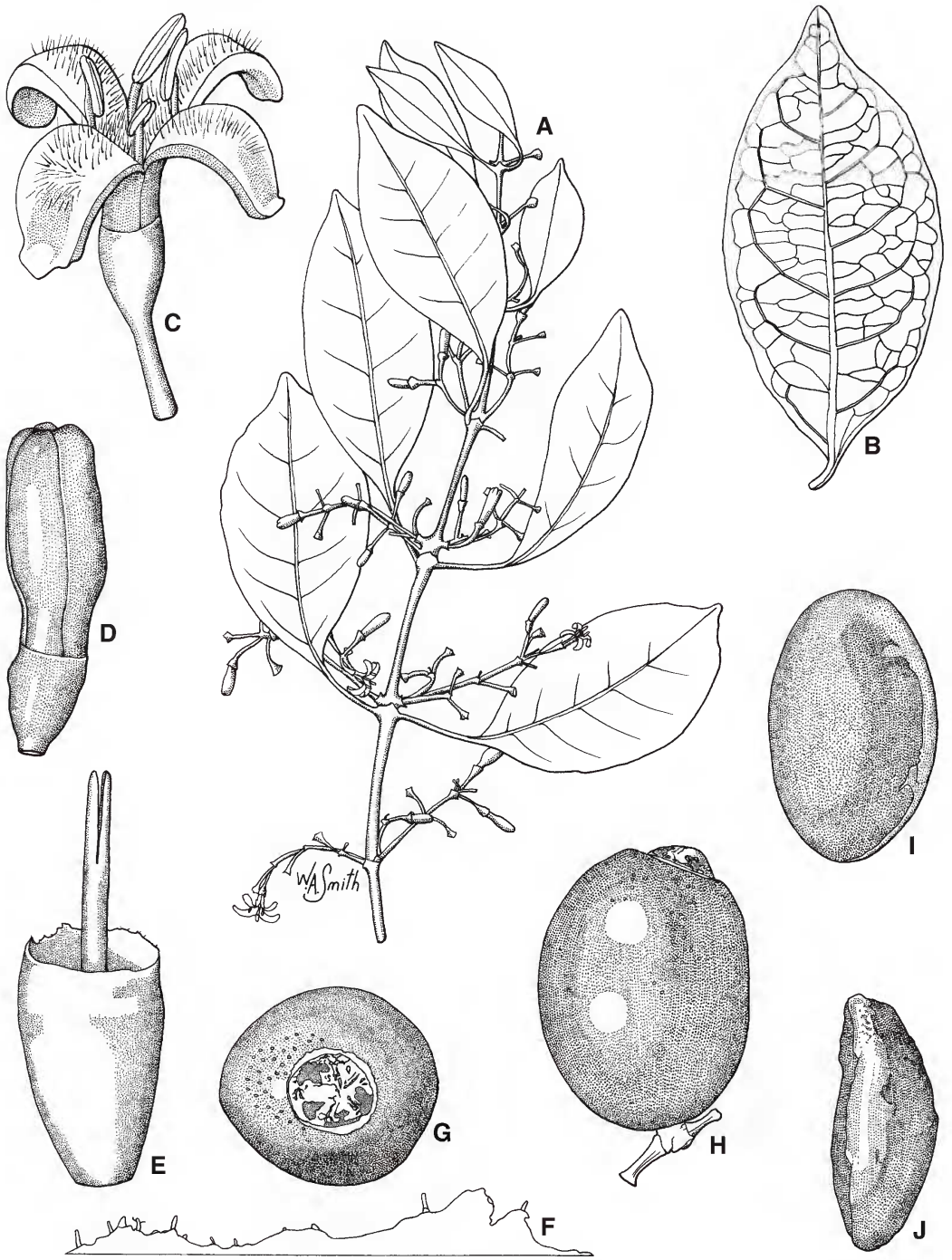
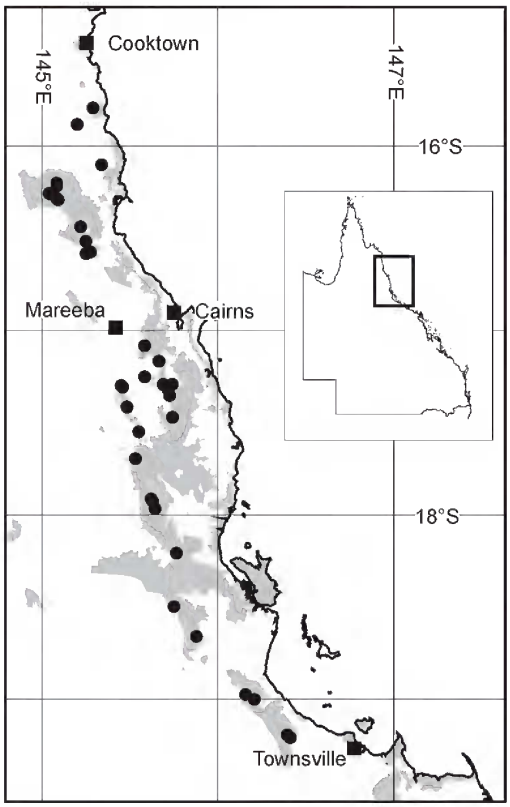


Fig. 1. ***Gynochthodes oresbia.*** A. branchlet with inflorescences × 0.8. B. abaxial surface of leaf showing venation × 1. C. flower at anthesis × 4. D. flower bud × 4. E. calyx (including hypanthium) and style at anthesis × 8. F. calyx rim with hairs × 50. G. adaxial view of fruit × 3. H. lateral view of fruit × 3. I. adaxial view of pyrene × 5. J. lateral view of pyrene × 5. A–F from *Gray 8390* (BRI); G–J from *Gray 1667* (BRI). Del. W. Smith.

acuminate with acumen 5–8 mm long; margins entire; venation brochidodromous, midrib slightly raised on both surfaces when fresh and also when dry; primary lateral veins 5–8 on each side of midrib, at 65–75° to the midrib; intramarginal and intralateral veins very slightly raised on both surfaces when fresh, more strongly raised on both surfaces when dry but not conspicuous; intralateral veins reticulate; domatia absent. Inflorescences usually axillary, rarely ramiflorous or appearing terminal, paniculiform, umbelliform cymes, or often raceme-like, with occasionally lateral branches of the first node on primary axis with dichasial triads, lateral branches of subsequent nodes on primary axis monads and ultimate node with dichasial triad or 4-flowered umbelliform cyme, (3–) 5–7(–10) flowered; peduncle 2–3.6 mm long; primary axis 10–40 mm long; bracts *c.* 1 mm long, persistent, similar in appearance to the stipules. Flowers epigynous, fragrant, bisexual (?), 4–6-merous, *c.* 15 mm long and 10 mm diameter; pedicels 3–6 mm long, not elongating after anthesis. Calyx (including hypanthium) cup-shaped, *c.* 2.5 × 2.5 mm, green or creamy white (*Gray 8390*, *Jensen 1411 & McKenna*); tube *c.* 1.1 mm long, glabrous on both surfaces; margin erose and with sparse minute hairs. Corolla cream to white when fresh, turning black when dry or preserved, glabrous abaxially except for minute hairs distally; corolla tube ± cylindrical, 1.8–2.3 mm long, fenestrated by short longitudinal splits in lower half; corolla lobes reflexed at anthesis, 4 or 5 (rarely 6), narrowly elliptic to lanceolate-elliptic, 6–7.5 mm long, 2–2.8 mm wide, densely villose with hairs to 1.5 mm long usually for the proximal two thirds to four fifths adaxially, ± cucullate at apex. Stamens 4 or 5 (rarely 6), exserted, inserted on corolla at lobe sinuses; filaments terete, 2.7–3.1 mm long, glabrous; anthers oblong, bilocular, 2.5–3.3 mm long, dorsifixed, point of attachment in lower third, dehiscing ± laterally. Ovary *c.* 2.1 mm high, bilocular; ovules 2 in each locule, slightly domed, *c.* 0.5 mm long, glabrous; style glabrous, *c.* 1.9 mm long, longitudinally furrowed; stigma bifid, *c.* 2.1 mm long. Fruit a drupe, globose to ellipsoid, 11–15 mm long, 9–12 mm diameter, glabrous, smooth, black (?), 1–4 seeded (usually 2 or 3); seeds 2 or 3-faced, 5.5–6.5 mm long, 2–3 mm wide, enclosed in a bony pyrene slightly larger than the seed; testa colour unknown; embryo *c.* 3 mm × 0.4 mm. **Fig. 1.**

***Additional selected specimens (from 34 examined)*: Queensland.** Cook District: T.R. 165, track to Mt Misery, tributary of East Normanby River, site 77, Nov 2002, *Ford 3724 & Holmes* (BRI, QRS); S.F.R 144, Agapetes L.A., Apr 1980, *Gray 1677*[2] (BRI, QRS); Mt Windsor, S.F.R 144 E.P./30, Jul 1976, *Unwin 34* (QRS); S.F.R. 144, Fantail L.A., Mt Windsor Tableland, Mar 1981, *Unwin 831* (QRS); T.R. 165, McDowall Range, *c.* 500m NE of tower, site 93, Jun 2003, *Ford 3995 et al.* (BRI, QRS); S.F.R. 143, North Mary L.A., Feb 1975, *Hyland 8006*[3] (QRS); S.F.R. 607, Emerald L.A., Aug 1980, *Gray 20146V* (QRS); EP 3, SFR 607, Emerald L.A., Oct 1981, *Sanderson 1823* (QRS); Tinaroo Range, May 1972, *Crome 445*[2] (QRS); Lamb Range, NE of Atherton, 9.6 km from Tinaroo-Danbulla road via Robson Creek road, May 1972, *Wrigley 398*[2] *& Telford* (BRI); S.F.R. 194, Barron, Scrubby L.A., Jul 1998, *Hyland 21281V* (BRI, QRS); S.F.R. 194, E.P. 38, Jan 1978, *Risley 276* (QRS); Westcott road, Topaz, Jan 2006, *Cooper 1942*[3] *& Cooper* (BRI, QRS); S of Butcher Creek Gadgarra S.F., S.F. 310, Jun 1995, *Hunter 3914* (BRI); N.P.R. 904, Wooroonooran, *c.* 700 m S of Towalla Mine, above Coolamon Creek, site 33, Oct 2001, *Ford 3034 et al.* (BRI, QRS); Kenny road, off Millaa Millaa – Malanda road, Jan 2005, *Jensen 1411*[1] *& McKenna* (BRI); E.P. 29, S.F.R. 650, Mt Fisher, Jan 1976, *Sanderson 850* (QRS). North Kennedy District: S.F.R. 251, Koolmoon L.A., 1.5km S of Coochimbeerum road off Tully Falls road, site 74, Nov 2002, *Ford 3697 & Holmes* (BRI, QRS); E.P. 19, Burgoo L.A., Garrawalt, Jul 1975, *Sanderson 650* (QRS); S.F.R. 458, off Old Mill road, west of Abergowrie, site 91, May 2003, *Ford 3934 et al.* (BRI, QRS); S.F.R. 268, Bluewater Forestry Area, Paluma Range, site 38, Nov 2001, *Ford 3080 & Holmes* (BRI, QRS). (fertile specimens indicated with a superscript numeral after the collectors number, [1] = flowering specimen, [2] = fruiting specimen, [3] = post anthesis specimen)

***Distribution and habitat*:** *Gynochthodes oresbia* is endemic to the Wet Tropics bioregion in north-eastern Queensland, where it is currently known to occur from the Cooktown area (Mt Finnigan and Mt Misery) to the Paluma Range (west of Townsville) (**Map 1**). It inhabits predominantly the wetter and more mountainous notophyll vine-forests/ rainforests on soils derived from rhyolite, granite, fine grained metasediments (including mudstone and conglomerate) and basalt. However it is more commonly encountered on granitic and rhyolitic substrates, with occurrences on basalt and metasediments being rare. In addition, a specimen has also been recorded as occurring in open forest (*Hunter 3914*) on soils derived from metasediments. Similar observations from



Map 1. Distribution of *Gynochthodes oresbia* ●. Shaded area on map indicates nature conservation reserves (National Parks, Forest Reserves and Conservation Parks).

this habitat have been made by the first author in Dinden National Park on granitic substrates. Common canopy species that grow in association with *G. oresbia* include: *Balanops australiana* F.Muell., *Beilschmiedia collina* B.Hyland, *B. recurva* B.Hyland, *Cardwellia sublimis* F.Muell., *Canarium australasicum* F.Muell., *Cryptocarya corrugata* C.T.White & W.D.Francis, *Elaeocarpus elliffii* B.Hyland & Coode, *E. foveolatus* F.Muell., *Flindersia bourjotiana* F.Muell., *Flindersia pimenteliana* F.Muell., *Halfordia kendack* (Montrouz.) Guillaumin and *Syzygium endophloium* B.Hyland. Common small trees and shrubs throughout most of its range include: *Apodytes brachystylis* F.Muell., *Bobea myrtoides* (F.Muell.) Valeton, *Bubbia semecarpoides* (F.Muell.) B.L.Burtt, *Chionanthus axillaris* R.Br., *Pilidiostigma tetramerum* L.S.Sm., *Pittosporum rubiginosum* A.Cunn., *Polyscias australiana* (F.Muell.) Philipson and *Psychotria sp.* (Danbulla S.T.Blake 15262). Altitudinal range, from existing specimens, is 590–1200 m.

Gynochthodes oresbia has been collected or reliably reported in the following RE's: 7.8.2 (rarely), 7.8.4 (rarely); 7.11.12 (rarely), 7.11.29 (rarely), 7.11.31 (rarely); 7.12.16 (commonly), 7.12.19 (commonly), 7.12.26 (rarely), 7.12.48 (occasionally), and 7.12.50 (occasionally).

***Phenology*:** Flowers have been recorded from December and February; fruits have been recorded in April and May.

Notes: The only flowering collections of *Gynochthodes oresbia* (*Gray 8390* and *Jensen 1411 & McKenna*) seen by the authors are tentatively interpreted as having bisexual flowers. This is in contrast to Halford (2004) who suspected the flowers examined of *G. sessilis* were possibly unisexual, as they "lacked a well developed style and stigma" even though "the ovaries are well developed with what appears to be functional ovules". The above flowering specimens of *G. oresbia* both had a well developed style with large bifid stigmas and large ovules. However, the style and stigmas were not exserted, as would normally be expected with a bisexual Rubiaceae flower. This uncertainty about the reproductive strategy within *Gynochthodes* is not new. Backer and Bakhuizen van den Brink (1965) suggest that the flowers of *G. coriacea* Blume are "seemingly" and "probably bisexual", yet they also acknowledge that the flowers are unisexual "according to Boerlage", whilst Johansson (1988) reports that the flowers of *G. australiensis* were "hermaphrodite or unisexual". Further flowering material is therefore required to assess the reproductive strategies within *G. oresbia.*

The flowers of *Gynochthodes oresbia* have been recorded as strongly fragrant (*Jensen 1411 & McKenna*) or perfumed (*Gray 8390*) at anthesis. Juvenile leaves of *G. oresbia* are similar to adult leaves, but slightly larger. The dimensions of leaves in the above description refer to adult leaves only. Leaves are bluish-green above when fresh (*Ford 3934 et al.*).

Gynochthodes oresbia is a large and woody vine that grows high into the rainforest

canopy (hence its cryptic (concealed) form to most human collectors) and has been rarely collected with its growth form as "vine" clearly recorded. It is more usual to see this species as a sterile, stiff and languid shrub in the understory. The closely related *G. sessilis* is often seen in a similar state but rarely becomes quite as shrub-like as *G. oresbia.*

Affinities: *Gynochthodes oresbia* is similar to *G. australiensis* from the Northern Territory and North Queensland, and *G. sessilis* from Queensland. A comparison of diagnostic differences between the three Australian species is provided in **Table 1**. Also, although *G. oresbia* and *G. sessilis* occur in close geographic proximity to each other in the Wet Tropics bioregion they inhabit very different rainforest communities and currently have non-overlapping elevations and distributions, with *G. oresbia* recorded for 590–1200 m and *G. sessilis* recorded from sea level to 520 m.

Sterile (and juvenile) dried material of *Gynochthodes oresbia* can be distinguished from *G. sessilis* by careful examination of the midrib on the abaxial surface. For *G. oresbia* the midrib is longitudinally striated, whereas *G. sessilis* has a somewhat pustular or 'lumpy' appearance. Both *G. oresbia* and *G. australiensis* have longitudinally striated midribs, and can be distinguished on the basis of the leaf apex and secondary venation.

Gynochthodes oresbia resembles *G. epiphytica* (Rechinger) A.C.Sm. & S.P.Darwin from Fiji, Samoa, Tonga and nearby islands, in its inflorescence, but differs by its lack of domatia and by its primary lateral venation on mature leaves arising at 65–75° from the midrib (compared with 40–50° for *G. epiphytica*).

Table 1. Morphological comparison between *G. oresbia*, *G. australiensis* and *G. sessilis*

Characters	*G. oresbia*	*G. australiensis*	*G. sessilis*
Leaf apex	acuminate	obtuse to bluntly pointed	acuminate
Leaf acumen length	5–8 mm	1–3 mm	5–10 mm
Secondary venation	inconspicuous, slightly raised	conspicuous, strongly raised	inconspicuous to conspicuous, slightly raised
Staminal filament length	2.7–3.1 mm	1.2–2.5 mm	2–3 mm
Flowers/inflorescence	3 to 10	up to 30	up to 12
Arrangement of flowers	lax raceme-like, paniculiform or umbelliform cymes	congested paniculiform or cymose clusters	fasciculate clusters
Length of primary axis of inflorescence	10–40 mm	4–20 mm	< 1 mm
Corolla lobe length	6–7.5 mm	5.5–7 mm	6–7 mm
Calyx size	*c.* 2.5 × 2.5 mm	2–3 × 1.5–1.7 mm	*c.* 2 × 2 mm
Calyx indumentum	glabrous	glabrous	sparsely hairy
Pedicel length	3–6 mm	0.5–14 mm	absent

***Conservation status*:** Most existing collections have been made within the World Heritage Area of the Wet Tropics. *Gynochthodes oresbia* has been collected in Wooroonooran, Dinden (formerly known as S.F.R. 607), Danbulla (formerly known as S.F.R. 185, in part), Maalan (formerly known as S.F.R. 650) and Girringun (formerly known as S.F.R. 458) National Parks and reported in the vast mountainous areas within the Daintree N.P. and the Paluma Range N.P. (A. Ford, pers. obs). It has a wide geographical range, with an extent of occurrence estimated to be 6,800 km^2 and an area of occupation estimated to be 3,560 km^2; hence, it is not considered at risk at this time.

***Etymology*:** The specific epithet is derived from the Greek adjective, *oresbios*, living on mountains and refers to the habitat of the species.

Key to the species of *Gynochthodes* in Australia*

1 Flowers arranged in dense fasciculate clusters; calyx hairy; N Qld to CE Qld . . . . . **G. sessilis**
Flowers arranged in cymose to paniculate inflorescences; calyx glabrous **2**

2 Leaf apex obtuse to bluntly pointed, acumen to 3 mm long; N.T. to N Qld . . . . . **G. australiensis**
Leaf apex acuminate, acumen 5–8 mm long; NE Qld . . . . . **G. oresbia**

* The above key excludes a probable undescribed species of *Gynochthodes* from the Northern Territory. It is currently only known from sterile and fruiting collections (Dale Dixon, 2005, pers. comm.). It differs from the other Australian species of *Gynochthodes* by having domatia.

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